CLAIMS

1. System for controlling the state and operation of a motor vehicle equipped with a dynamic braking device (6) and a static braking device (7), characterized in that it comprises a certain number of sensors (C1, ... Cn) on board the vehicle, such as, for example, a sensor of the longitudinal deceleration of the vehicle, at least one sensor of the rotation speed of one of the wheels of the vehicle, a sensor of the displacement of the wheels of the vehicle with respect to the body of the latter, and a sensor of the pressure of the master cylinder, a piloting device (15) receiving information from the various sensors and adapted to determine from this information and, when appropriate, from the information representative of the states of the brake and acceleration (2) pedals of the vehicle, the state of the vehicle and to calculate braking orders transmitted to the dynamic (6) and static (7) braking devices, making it possible in particular to maintain the vehicle immobilized as soon as its speed is zero, to restart the vehicle after it has stopped, to trigger a controlled deceleration of the vehicle, or to ensure a secure braking of the vehicle in a stopped state of the latter.

2. System according to claim 1, characterized in that the piloting device (15) is adapted to immobilize the vehicle as soon as its speed is zero by braking the latter through the simultaneous actuation of its dynamic braking device (6) and of its static braking device (7) when the vehicle is located on a relatively steep slope, for example, of at least 20%.

3. System according to claim 1 or 2, characterized in that the piloting device is adapted to immobilize the vehicle as soon as its speed is zero by braking the latter through the actuation of its static braking device when the vehicle is located on a relatively gentle slope, for example, of less than 3%.

4. System according to one of the preceding claims, characterized in that the piloting device (15) makes it possible to determine the slope on which the vehicle is moving by calculating the difference between the value of the longitudinal deceleration of the vehicle provided by the sensor of the longitudinal deceleration and the value of the longitudinal deceleration calculated from the sensor of the rotation speed of a wheel of the vehicle to determine a shift value of the longitudinal deceleration $\gamma_{longislope}$ and by calculating the slope according to the formula:

$$slope[\%] = 100 \times \tan\left\{\arcsin\left(\frac{\gamma longislope}{g}\right)\right\}$$

5. System according to claim 4, characterized in that the piloting device (15) makes it possible to analyze the evolution of the calculated slope to verify its coherence with the distance covered by the vehicle so as to avoid taking into account for the immobilization of the vehicle a small distance covered by the latter for a calculated slope gap, by using the following formula:

$$\Delta slope = Arc\cos\left(\frac{b - \Delta b}{a}\right) - Arc\cos\left(\frac{b}{a}\right)$$

where a is the wheel base of the vehicle and

b is the distance covered by the vehicle.

6. System according to claim 4 or 5, characterized in that the piloting device (15) calculates a correction of the value of the longitudinal deceleration provided by the corresponding sensor from the sensors of the displacement of the front and rear wheels with respect to the body of the vehicle according to the formula:

$$\gamma longisenscorr = \gamma longisensor - \sin\left(\arctan\left(\frac{Zfr - Zfr}{a}\right)\right)$$

where Z_{fr} is the displacement of the front wheels,

Z_{re} is the displacement of the rear wheels, and

a is the wheel base of the vehicle.

7. System according to one of the preceding claims, characterized in that the piloting device (15) calculates an optimized braking pressure order applied to the dynamic braking device as a function of the slope on which the vehicle is moving and of an estimation of the global braking effectiveness of the vehicle determined by the longitudinal deceleration of the vehicle for a given braking pressure resulting from pushing on the brake pedal by the driver of the vehicle during the braking operations of the latter.

8. System according to claim 7, characterized in that the piloting device (15) optimizes the braking pressure order to a value just required for maintaining the vehicle in a stopped state increased by a multiplying security factor so that the braking pressure applied to the dynamic braking device (6) is above the zone (Z) of braking noises.

9. System according to claim 8, characterized in that the dynamic braking system (6) is activated by the piloting device (15) so as to apply the braking order to the four wheels of the vehicle and when the dynamic braking device (6) is deactivated, the braking pressure falls brutally under the noise zone, then decreases more slowly to a zero value.

10. System according to one of the preceding claims, characterized in that, during a deceleration of the vehicle, the piloting device (15) calculates a deceleration value from each of the sensors of the speed of the wheels of the vehicle according to the formula:

$$\gamma longiwheels = 2\frac{2\pi R}{N} \times \frac{\frac{1}{Tn} - \frac{1}{Tn-1}}{Tn + Tn - 1} -$$

where R: rolling radius of the wheel

N: number of tops per revolution of the sensor

Tn, Tn-1: present and past periods of the square signal provided by the sensor inversely proportional to the rotation speed of the wheel,

the piloting device performing an average of the four calculated values of the longitudinal decelerations for the four wheels and calculating the speed of the vehicle from each calculated value of the deceleration according to the formula:

$$V(t) = \frac{2\pi R}{NTn} \times \gamma longiwheels \frac{Tn + t}{2}$$

where t: time passed since the last upward front of the square signal of the sensor,

and the piloting device performs an average of the four calculated values of the speed of the vehicle.

11. System according to one of the preceding claims, characterized in that the static braking device (7) comprises an electric geared motor (11) driving at least a cable (12) for actuation of a parking brake acting on the rear wheels of the vehicle and in that the piloting device (15) calculates the clamping effort in the cable (12) by determining the torque at the exit of the electric motor from the intensity of the electric current of the motor and the output of the reducer of the latter.

12. System according to one of the preceding claims, characterized in that the piloting device (15) actuates the static braking device (7) when the driver actuates the control button of the latter and when the driver pushes simultaneously on the brake pedal to ensure an emergency mode when the dynamic braking device (6) is out of service.

13. System according to one of the preceding claims, characterized in that the piloting device (15) maintains the dynamic (6) and/or static (7) braking device activated if the driver

brings the selecting lever of the gear box into the dead center or neutral position when the vehicle is stopped and the piloting device (15) does not activate any of the dynamic (6) and static (7) braking devices if the vehicle stops with this lever in the dead center or neutral position.

14. System according to one of the preceding claims, characterized in that the piloting device (15) applies to the dynamic braking device (6) and/or to the static braking device (7) a higher braking pressure order in the case of overloading of the vehicle signaled to the piloting device (15) by a manual action of the driver, such as by pushing for a determined duration on a control switch of the static braking device (7).